

NE-1038

- 13 -

What is claimed is:

1           1.    A method of controlling the transmit power of a plurality of  
2   CDMA downlink channels from a base station within a control range  
3   between a nominal lower limit and a nominal upper limit, comprising the  
4   steps of:

5           receiving, at said base station, a command signal from a mobile  
6   station requesting the base station to decrease the transmit power of a  
7   downlink channel; and

8           decreasing, at said base station, said transmit power of said  
9   downlink channel if said downlink channel has a quality higher than a  
10   specified threshold value at said mobile station.

1           2.    The method of claim 1, further comprising the steps of:

2           receiving, at said base station, a command signal from said mobile  
3   station requesting the base station to increase the transmit power of said  
4   downlink channel; and

5           increasing said transmit power if total transmit power of said  
6   downlink channels is lower than a specified threshold value.

1           3.    A method of controlling the transmit power of a plurality of  
2   CDMA downlink channels from a base station within a control range  
3   between a nominal lower limit and a nominal upper limit, comprising the  
4   steps of:

5           receiving, at said base station, a command signal from said mobile  
6   station requesting the base station to increase the transmit power of said  
7   downlink channel; and

NE-1038

- 14 -

8           increasing said transmit power if total transmit power of said  
9   downlink channels is lower than a specified threshold value.

1           4.   A method of controlling the transmit power of a plurality of  
2   CDMA downlink channels from a base station within a control range  
3   between a nominal lower limit and a nominal upper limit, comprising the  
4   steps of:

5           a)   receiving, at said base station, a command signal from a  
6   mobile station requesting the base station to decrease the transmit power  
7   of a downlink channel;

8           b)   decreasing the transmit power of said downlink channel if a  
9   hypothetically decremented value of said transmit power is higher than  
10   said nominal lower limit;

11          c)   decreasing said transmit power of said downlink channel if  
12   said downlink channel has a quality lower than a specified threshold  
13   value at said mobile station even when said hypothetically decremented  
14   value is lower than said nominal lower limit; and

15          d)   setting said transmit power of said downlink channel equal to  
16   said nominal lower limit if said hypothetically decremented value is  
17   lower than said nominal lower limit and the quality of said downlink  
18   channel is lower than said specified threshold value.

1           5.   The method of claim 4, further comprising the steps of:

2           receiving, at said base station, a command signal from said mobile  
3   station requesting the base station to increase the transmit power of said  
4   downlink channel;

5           increasing said transmit power of said downlink channel if a

NE-1038

- 15 -

6 hypothetically incremented value of the transmit power is lower than  
7 said nominal upper limit;  
8 increasing said transmit power if total transmit power of said  
9 downlink channels is lower than a specified threshold value even when  
10 said hypothetically incremented value is greater than said nominal upper  
11 limit; and  
12 setting said transmit power equal to said nominal upper limit if  
13 said hypothetically incremented value is greater than said nominal upper  
14 limit and said total transmit power is equal to or higher than said  
15 specified threshold value.

1 6. The method of claim 4, wherein the step (c) comprises the  
2 steps of:  
3 c<sub>1</sub>) receiving, at said base station, a quality indicating signal from  
4 said mobile station indicating a quality of said downlink channel at said  
5 mobile station;  
6 c<sub>2</sub>) determining whether the quality of said downlink channel  
7 indicated by said quality indicating signal is higher than said specified  
8 threshold value; and  
9 c<sub>3</sub>) decreasing said transmit power if said quality is higher than  
10 said specified threshold value even when said hypothetically  
11 decremented value is lower than said nominal lower limit.

1 7. The method of claim 6, wherein said quality indicating signal  
2 represents a signal to interference ratio of said downlink channel at said  
3 mobile station.

NE-1038

- 16 -

1           8.    The method of claim 4, wherein the step (b) comprises  
2    decrementing said power level by a stepsize value which varies  
3    depending on the length of time during which said power level is lower  
4    than a predetermined level.

1           9.    The method of claim 4, wherein the step (c) comprises  
2    decrementing said power level by a stepsize value which varies  
3    depending on the length of time during which said power level is lower  
4    than a predetermined level.

1           10.   The method of claim 8, wherein the step (b) comprises the  
2    steps of incrementing a count value if said power level is lower than said  
3    predetermined level and increasing said stepsize value when the count  
4    value reaches a predetermined value.

1           11.   The method of claim 9, wherein the step (c) comprises the  
2    steps of incrementing a count value if said power level is lower than said  
3    predetermined level and increasing said stepsize value when the count  
4    value reaches a predetermined value.

1           12.   A method of controlling the transmit power of a plurality of  
2    CDMA downlink channels from a base station within a control range  
3    between a nominal lower limit and a nominal upper limit, comprising the  
4    steps of:

5           receiving, at said base station, a command signal from a mobile  
6    station requesting the base station to decrease the transmit power of a  
7    downlink channel;

NE-1038

- 17 -

8 decreasing the transmit power of said downlink channel if a  
9 hypothetically decremented value of said transmit power is higher than  
10 said nominal lower limit;

11 incrementing a count value as long as said hypothetically  
12 decremented value is lower than said nominal lower limit;

13 setting the transmit power of said downlink channel to said  
14 nominal lower limit if said count value is smaller than a predetermined  
15 count value; and

16 decreasing the transmit power of said downlink channel if said  
17 count value reaches said predetermined count value.

1 13. The method of claim 12, further comprising the steps of:

2 receiving, at said base station, a command signal from said mobile  
3 station requesting the base station to increase the transmit power of said  
4 downlink channel;

5 increasing said transmit power of said downlink channel if a  
6 hypothetically incremented value of the transmit power is lower than  
7 said nominal upper limit;

8 increasing said transmit power if total transmit power of said  
9 downlink channels is lower than a specified threshold value even when  
10 said hypothetically incremented value is greater than said nominal upper  
11 limit; and

12 setting said transmit power equal to said nominal upper limit if  
13 said hypothetically incremented value is greater than said nominal upper  
14 limit and said total transmit power is equal to or higher than said  
15 specified threshold value.

NE-1038

- 18 -

1        14. A method of controlling the transmit power of a plurality of  
2 CDMA downlink channels from a base station within a control range  
3 between a nominal lower limit and a nominal upper limit, comprising the  
4 steps of:

5        receiving, at said base station, a command signal from said mobile  
6 station requesting the base station to increase the transmit power of said  
7 downlink channel;

8        increasing said transmit power of said downlink channel if a  
9 hypothetically incremented value of the transmit power is lower than  
10 said nominal upper limit;

11       increasing said transmit power if total transmit power of said  
12 downlink channels is lower than a specified threshold value even when  
13 said hypothetically incremented value is greater than said nominal upper  
14 limit value; and

15       setting said transmit power equal to said nominal upper limit  
16 value if said hypothetically incremented value is greater than said  
17 nominal upper limit value and said total transmit power is equal to or  
18 higher than said specified threshold value.

1       15. A CDMA communication system comprising:

2       a plurality of mobile stations; and

3       a base station for establishing a plurality of downlink channels to  
4 said mobile stations, receiving a power command signal from a mobile  
5 station requesting the base station to decrease the transmit power of a  
6 downlink channel, and decreasing said transmit power regardless of a  
7 nominal lower limit of a power control range if the downlink channel has

NE-1038

- 19 -

8 a quality higher than a specified threshold value at said mobile station.

1 16. The CDMA communication system of claim 15, wherein the  
2 base station is further arranged to:

3 receive a command signal from a mobile station requesting the  
4 base station to increase the transmit power of a downlink channel, and  
5 increase said transmit power of the downlink channel if total  
6 transmit power of said downlink channels is lower than a specified  
7 threshold value.

1 17. A CDMA communication system comprising:

2 a plurality of mobile stations; and

3 a base station for establishing a plurality of downlink channels to  
4 said mobile stations, receiving a command signal from a mobile station  
5 requesting the base station to increase the transmit power of a downlink  
6 channel, and increasing said transmit power of the downlink channel if  
7 total transmit power of said downlink channels is lower than a specified  
8 threshold value.

1 18. A CDMA communication system comprising:

2 a plurality of mobile stations; and

3 a base station for establishing a plurality of downlink channels to  
4 said mobile stations, receiving a command signal from a mobile station  
5 requesting the base station to decrease the transmit power of a downlink  
6 channel, decreasing the transmit power of said downlink channel if a  
7 hypothetically decremented value of said transmit power is higher than a  
8 nominal lower limit of a power control range, decreasing said transmit

NE-1038

- 20 -

9 power of said downlink channel if said downlink channel has a quality  
10 lower than a specified threshold value at said mobile station even when  
11 said hypothetically decremented value is lower than said nominal lower  
12 limit, and setting said transmit power of said downlink channel equal to  
13 said nominal lower limit if said hypothetically decremented value is  
14 lower than said nominal lower limit and the quality of said downlink  
15 channel at said mobile station is lower than said specified threshold  
16 value.

1 19. The CDMA communication system of claim 18, wherein said  
2 base station is arranged to:  
3 receive a command signal from said mobile station requesting the  
4 base station to increase the transmit power of said downlink channel;  
5 increase said transmit power of said downlink channel if a  
6 hypothetically incremented value of the transmit power is lower than  
7 said nominal upper limit;  
8 increase said transmit power if total transmit power of said  
9 downlink channels is lower than a specified threshold value even when  
10 said hypothetically incremented value is greater than said nominal upper  
11 limit; and  
12 set the transmit power equal to said nominal upper limit if said  
13 hypothetically incremented value is greater than said nominal upper  
14 limit and said total transmit power is equal to or higher than said  
15 specified threshold value.

1 20. The CDMA communication system of claim 18, wherein the  
2 base station is arranged to:

NE-1038

- 21 -

3 receiving a quality indicating signal from said mobile station  
4 indicating a quality of said downlink channel at said mobile station;  
5 determine whether the quality of said downlink channel indicated  
6 by said quality indicating signal is higher than said specified threshold  
7 value; and  
8 decrease said transmit power if said quality is higher than said  
9 specified threshold value even when said hypothetically decremented  
10 value is lower than said nominal lower limit.

1 21. The CDMA communication system of claim 18, wherein said  
2 quality indicating signal represents a signal to interference ratio of said  
3 downlink channel at said mobile station.

1 22. The CDMA communication system of claim 18, wherein the  
2 base station is arranged to decrement said power level by a stepsize value  
3 which varies depending on the length of time during which said power  
4 level is lower than a predetermined level.

1 23. The CDMA communication system of claim 18, wherein the  
2 base station is arranged to decrement said power level by a stepsize value  
3 which varies depending on the length of time during which said power  
4 level is lower than a predetermined level.

1 24. The CDMA communication system of claim 22, wherein the  
2 base station is arranged to increment a count value if said power level is  
3 lower than said predetermined level and increase said stepsize value  
4 when the count value reaches a predetermined value.

NE-1038

- 22 -

1           25. The CDMA communication system of claim 24, wherein the  
2 base station is arranged to increment a count value if said power level is  
3 lower than said predetermined level and increase said stepsize value  
4 when the count value reaches a predetermined value.

1           26. A CDMA communication system comprising:  
2 a plurality of mobile stations; and  
3 a base station for establishing a plurality of downlink channels to  
4 said mobile stations, receiving a command signal from a mobile station  
5 requesting the base station to decrease the transmit power of a downlink  
6 channel, decreasing the transmit power of said downlink channel if a  
7 hypothetically decremented value of said transmit power is higher than  
8 said nominal lower limit, incrementing a count value as long as said  
9 hypothetically decremented value is lower than said nominal lower limit,  
10 setting the transmit power of said downlink channel to said nominal  
11 lower limit if said count value is smaller than a predetermined count  
12 value, and decreasing the transmit power of said downlink channel if said  
13 count value reaches said predetermined count value.

1           27. The CDMA communication system of claim 26, wherein the  
2 base station is arranged to:  
3 receive a command signal from said mobile station requesting the  
4 base station to increase the transmit power of said downlink channel;  
5 increase said transmit power of said downlink channel if a  
6 hypothetically incremented value of the transmit power is lower than  
7 said nominal upper limit;

NE-1038

- 23 -

8           increase said transmit power if total transmit power of said  
9   downlink channels is lower than a specified threshold value even when  
10   said hypothetically incremented value is greater than said nominal upper  
11   limit; and

12           set the transmit power equal to said nominal upper limit if said  
13   hypothetically incremented value is greater than said nominal upper  
14   limit and said total transmit power is equal to or higher than said  
15   specified threshold value.

1           28. A CDMA communication system comprising:  
2           a plurality of mobile stations; and  
3           a base station for establishing a plurality of downlink channels to  
4   said mobile stations, receiving, at said base station, a command signal  
5   from said mobile station requesting the base station to increase the  
6   transmit power of said downlink channel, increasing said transmit power  
7   of said downlink channel if a hypothetically incremented value of the  
8   transmit power is lower than a nominal upper limit of a power control  
9   range, increasing said transmit power if total transmit power of said  
10   downlink channels is lower than a specified threshold value even when  
11   said hypothetically incremented value is greater than said nominal upper  
12   limit, and setting said transmit power equal to said nominal upper limit if  
13   said hypothetically incremented value is greater than said nominal upper  
14   limit and said total transmit power is equal to or higher than said  
15   specified threshold value.